Hazardous Material Spill Response

LG #11

A. Introduction

Introduction

- **Because of extremely hazardous nature of many materials used aboard ships:**
  - **Only trained personnel shall respond to an HM spill**
  - **Personnel trained by division officers or supervisory personnel for cleanup of small spills**
  - **MSDS used to conduct training**

Available Documentation

- **Used for specific situations**
  - **Naval Warfare Publication 62-1-- Surface Ship Survivability**
  - **NSTM 555 - Fire fighting**
  - **NSTM 079 - HM damage control**
  - **NSTM 077 - PPE guidance**
  - **NAVAIR 00-80-R-14 -- Aircraft HM fire fighting**
  - **OPNAVINST 5090.1(series) -- Over-the-side spills**

B. Spill Response Procedures

Nine Phases of Spill Response

1 **Discovery & Notification**
2 **Initiation of Action**
3 **Evaluation**
4 **Containment & Damage Control**
5 **Dispersion of Gases & Vapors**

Nine Phases of Spill Response

6 **Cleanup & Decontamination**

7 **Disposal of Contaminated Materials**

8 **Certification for Re-entry**

9 **Follow-up Reports**

Important Note

NOTE: Each response phase is NOT a separate response action entirely independent of all other phases. Several phases may occur simultaneously and may involve common elements in their operation. For example, containment and damage control may also involve cleanup and disposal techniques.

C. Spill Discovery and Notification

Discovery

- **Discovery occurs**
  - **During zone inspections**
  - **By detection devices (alarms)**
  - **During routine operations**
  - **During safety surveys**

I Found It!

- **Early detection is critical. Indicators include:**
  - **Leaking boxes**
  - **Sound of broken glass**
  - **Seepage around barrel rims**
  - **Unusual odors**
  - **Missing caps on containers**

Notification--to Whom?

- DO NOT touch spilled material
- Evacuate area & keep passersby out
- Report immediately to
  - Supervisory personnel
  - Officer of the deck (OOD)
  - Command Duty Officer (CDO)
- Crewmembers NOT to remain in area to investigate spill

Notification--What?

- **Report the following information:**
  - **Time of spill discovery**
  - **Location of the spill**
  - **Identification of spilled material**
  - **Behavior of the material**
    - **Are there any reactions occurring?**
  - **Source of the spill**
    - **Tanks, containers, etc.**

Notification--What?

- **Report the following information:**
  - **Personnel in vicinity of spill**
    - **Note name & department**
  - **Spill volume**
  - **Anticipated movement of the spill**
  - **Labeling or placarding information**
- **Report overboard spills in accordance with OPNAVINST 5090.1 (series)**

D. Initiation of Action

Spill Coordination

- **Coordination and direction may be accomplished by:**
  - **Ship's OOD**
  - **Ship's CDO**
  - **Fire chief**
  - **Damage control party leader**
  - **Senior person at the scene**

Action Steps

- **Scene leader will direct following steps:**
  - **Evacuate all personnel from areas that may be exposed to spilled material**
  - **Cordon off affected area until help arrives**
    - **May include securing power, deck drains & ventilation, setting spill boundaries, and staging backup personnel**
  - **Arrange first aid for any injured personnel**
    - **After ensuring no immediate threat of fire or explosion**

E. Evaluation

Obtaining Information

- **Obtain information from the MSDS:**
  - **Type and concentration of spilled material**
  - **Hazardous characteristics**
    - **Flash Point**
    - **Toxicity**
    - **Corrosiveness**
    - **Potentially incompatible substances**
    - **Expected effects of exposure**
    - **First aid for exposure**

Obtaining More Information

- **Determine dangerous conditions or consequences from spill**
  - **Fire or explosion**
  - **Presence of oxygen-deficient atmosphere**
  - **Presence of toxic or explosive gases**
  - **Possibility of dangerous vapors being drawn into ship’s ventilation system**
  - **Other HM in compartment which may contribute to fire, explosion, or may be incompatible**

Other Information

- **For safe and effective response, use MSDS to determine**
  - **Appropriate spill response equipment**
  - **Protective clothing**

F. Containment and Damage Control

Taking Action

- **Some or all of the following procedures may apply:**
  - **Fight fire (if any)**
    - **Methods must be compatible with material**
    - **Refer to NSTM 555, “Fire Fighting, Ships”**
  - **Shut off or stem spill at the source**
    - **Replace leaking containers**
    - **Plug leaks in tanks**
    - **Empty tank of remaining contents**
    - **Overpack leaking container**
    - **Segregate leaking container**

Further Action

- **Predict spill movement & take further action by:**
  - **Preventing spill from entering other compartments**
    - Close scuppers, drains, ventilation ducts, doors, hatches
  - **Contain liquid material using barriers**
    - Sand
    - Sorbents
    - Other equipment suitable to dam the flow

G. Dispersion of Gases and Vapors

General Rules

- **Flammable gases or vapors**
  - **Shall be dispersed or diluted ASAP**
  - **Shall not be allowed to enter other compartments**
  - **Dilute below Lower Explosive Limit (LEL)**
  - **Have gas free engineer check for LEL & Toxicity**

Dispersion of Contaminated Atmospheres

- **Use one of the following methods:**
  - **Normal exhaust ventilation (explosion-proof only)**
  - **Blow-out ventilation (explosion-proof only)**
  - **Doors & hatches open to weather**
  - **Portable fans (explosion-proof only)**

H. Cleanup and Decontamination

Cleaning Up

- Employ MSDS cleanup methods
- If mercury spill, use Appendix B3-B
- Thoroughly clean all surfaces of spilled material
- Thoroughly ventilate compartment
- Thoroughly decontaminate reusable PPE

Important Note

- **Identification of specific requirements for respiratory protection and proper use of this equipment is a critical aspect of all cleanup and decontamination operations.**

I. Disposal of Contaminated Materials

Getting Rid of the Stuff

- **All non-reusable cleanup materials (absorbents, disposable clothing, rags, brooms, containers) + the spilled material:**
  - **Placed in impermeable containers**
  - **Treated as Hazardous Waste**
    - **See Appendix L of OPNAVINST 5090.1 (series) for information on disposal**

J. Certification for Safe Re-entry

Requirements

- **OOD/CDO make determination for re-entry after ascertaining:**
  - **All surfaces cleaned of spilled material**
    - **deck, counters, bulkheads, overhead**
  - **All compartments adequately ventilated**
    - **Use analysis of gas free engineer**
  - **All contaminated cleanup materials packed, marked, handled as used HM**

K. Follow-up Reports

Who and What

- OOD/CDO submits spill report to HM Coordinator
- Copy filed by safety officer
- Following information required on spill report:
  - Date spill occurred
  - Spill location
  - Identity of spill material

What's Reported

- **More spill report requirements:**
  - **Cause(s) of spill**
  - **Damage or injuries resulting from spill**
  - **Response & cleanup measures taken**
  - **Problems encountered (if any)**
  - **Method of disposal of contaminated material**
  - **Action taken to prevent repeat of similar spill**